

From these few observations it appears that dark moths and butterflies prefer blue, red, black or green-colored objects on which to rest ; that white butterflies are most generally attracted by white flowers ; yellow butterflies by yellow flowers, while locusts decidedly prefer to rest on a white surface.

In the case of house-flies, and perhaps *Simulia* and Culicidæ, I have thought that as flies evidently love heat, being thermotropic, that as dark cloths absorb and retain the heat of the sun's rays better than white or pale materials, they "feel better," *i. e.*, they respond to the stimulus of the warmth of a dark surface, respire more rapidly and are more active ; the cause being a physical one.

It is also evident that all these insects have good eyesight, distinguishing at a considerable distance the different colors of small objects, or of more extended surfaces.

SOME PHILIPPINE MOSQUITOES.

By C. S. LUDLOW.

The study of the mosquitoes in the Philippine Islands is carried on by the authority of the Surgeon-General, U. S. A., and with the cooperation of the Medical Department to ascertain at what places and times those proven or likely to be proven disease carriers are prevalent. The work has been in progress now for about three years, the collections having come in from all parts of the Islands, from Appari in Luzon to Jolo in the Sulu Archipelago, and the records show that besides the information gained for the medical phase of the study there has also been gathered some of value only from the entomological standpoint.

Among the mosquitoes listed below are some recently described by Theobald (British Museum) as found in adjacent countries, a couple of *Anopheles* previously published in the Journal of the New York Entomological Society, and some new species, one of which Theobald publishes with my permission, from my MS. in the new volume of his Monograph.

Mr. Theobald has lately created from the *Anopheles* the new genus *Myzomyia*, but as I do not know the distinctive characteristics on

which the new genus is based I have retained the old nomenclature, putting the new name in parentheses in the species of which he has written me.

ANOPHELETES.

Anopheles philippinensis *Ludlow*.

A. sinensis *Wiedemann*.

A. “ var. **annularis** *van der Wulp*.

A. pseudobarbistrotris *Ludlow*.

A. (Myzomyia) rossii *Giles*.

A. (Myzomyia) ludlowii *Theobald*.

A. kochii *Donitz*.

A. funestus *Giles*.

A. ludlowii was referred to in my article “Two Philippine Mosquitoes” (Jour. N. Y. Ento. Soc., Sept., 1902) as *A. rossii* Giles having “curiously mottled legs not described for the type” and later specimens were sent to Mr. Theobald who found the variations considerable enough to be specific. It is, so far as the collections to date show, the most widely distributed of the *Anopheles* in the Islands, being sent in from many parts of Luzon, and some of the southern islands.

STEGOMYLÆ.

Stegomyia fasciata *Fabricius*.

S. “ var. **mosquito** *Desvoidy*.

S. “ var. **luciensis** *Theobald*.

S. scutellaris *Walker*.

S. “ var. — equivalent to *luciensis*, *i. e.*, a black tip on the last hind tarsal joint.

S. scutellaris subspecies **samarensis** *Ludlow*.

The specimens of *scutellaris* taken on Samar, differ from the type as follows :

I. Has two white lateral bands on the head.

II. The silvery median line on the thorax extends the whole length of the mesonotum, tapering from the cephalic end to just in front of the scutellum, and there is a narrow white line on each side extending cephalad from the scutellum about one third of the length of the mesonotum, and dividing its width almost exactly into quarters.

III. Femora of hind legs are white at the base with a white line reaching almost to the knee : on fore and mid legs this line is not so distinct nor is it so long : the metatarsi of the hind legs have a basal white band, and those of the fore and mid legs a basal white spot.

IV. The first submarginal cell is longer than its stem, and about the same width as second posterior.

While these variations are perhaps not specific they are certainly enough to create a subspecies. It is perhaps as close to *grantii* as to *scutellaris* Theob.

***Stegomyia nivea*, sp. nov.**

♀. Head covered with dark brown scales, which in some lights giving bronze iridescence, dark brown forked scales on the occiput, narrow white rim around the eyes; proboscis with dark brown scales also showing iridescence; palpi dark brown; antennæ dark brown, verticils brown, pubescence pale, eyes brown.

Thorax: the mesonotum densely covered with long curved white (silvery) scales from the neck about two thirds of the way, with three very narrow dark lines, one median and two submedian. The rest of the mesonotum with dark brown curved scales; scutellum covered with dark brown scales, also showing iridescence; metanotum nude; pleuræ dark brown, with silvery spots.

Abdomen covered dorsally with dark brown scales, the first three segments entirely brown, the fourth showing a small basal median white spot, the following segments basally white-banded, the bands heavier on the last two segments; brown and light hairs on the apex of each segment; ventrally the abdomen is basally white-banded throughout, the bands widened laterally so as to form heavy white basal lateral spots.

Legs: coxæ and trochanters light and ventral side of all the femora light, but the rest of the legs very are dark brown (almost black) except the femora of the legs, which are white dorsally, as well as ventrally two thirds of the distance from the trochanters to the tibiæ; the tarsal joints, including the metatarsus of the hind legs, are a slightly lighter brown, and show iridescence. Ungues simple and equal.

All the flat brown scales, on whatever part of the body, show bronze iridescence, but the curved and forked ones seem to lack it. This, of course, does not apply to wing scales.

The wings show the typical *Stegomyia* scales, brown; the first submarginal cell is slightly narrower and longer than the second posterior, the bases being nearly on a line; the mid- and supernumerary cross-veins meet the latter a little shorter than the mid-vein, and the posterior distant from the mid-vein about twice the latter's length.

Length 5.6 mm. (including proboscis).

Habitat: Oras, Samar, P. I. Caught. May-June, 1902.

This is an easily recognized species, the snowy thorax and white femora being distinctive.

***Stegomyia amesii*, sp. nov.**

♀. Head covered with dark brown scales, giving dark iridescence, a minute pale spot on the sides, forked scales dark brown, brown hairs between the eyes: antennæ dark brown, verticils brown, pubescence brown, first joint testaceous: palpi dark brown: proboscis very dark scaled, dark iridescence in some light: clypeus brown: eyes brown.

Thorax dark brown and rather closely covered with small slender dark brown curved scales : scutellum dark brown : metanotum dark brown ; pleuræ brown with three bunches of white scales.

Abdomen brown, heavily covered with dark brown scales giving dark green and blue iridescence, small white lateral spots on most of the segments : venter dark.

Legs dark brown, the femora light on ventral side, otherwise the whole of the leg is dark, but the scales are so iridescent, those of the femora and tibiæ reflecting green and blue lights, and those on metatarsi and tarsal joints giving bronze lights that the latter often appear much lighter. Ungues equal and simple.

Wings heavily brown scaled with typical *Stegomyia* scales : first submarginal cell a little longer and about the same width as the second posterior, its base slightly inferior to the latter's. The supernumerary cross-vein meets the mid at an obtuse angle and is about the same length as the mid, as is also the posterior cross-vein, which is distant from the mid about three times its own length. Halteres heavily light scaled on the stem, knob dark.

Length 3-3.5 mm.

Habitat : Oras, Samar. Tacloban, Leyte. Twin Peaks, Banquet. Luzon.

Caught. June-December.

This is a very small dark species near *S. minuta* Theob. and was sent me by Dr. Roger P. Ames, Major, Surgeon U. S. V., who did the clinical work in the investigation by Major Reed, Surgeon U. S. A., concerning mosquitoes and "yellow fever."

The *Stegomyia* are wide-spread throughout the Islands, *S. fasciata* Fabr. being apparently present in every locality, and very numerous. The others are not so frequently met, and *S. nivea* has been taken only at Oras, Samar.

DESVOIDEÆ. (ARMIGERES.)

Desvoidea fusca *Theob.*

Taken, so far, only in the southern islands.

In the last few months a new genus near *Stegomyia* has been created, the distinctive differences lying mostly in the head and wing scales, by which, as well as by the lack of the continuation of the third longitudinal vein, it is also separated from *Desvoidea*.

Finlaya *Theobald.*

Finlaya poicilia *Theobald.*

This mosquito is also confined to the southern islands.

Another species has come in in the last few days which is apparently undescribed, but there has not been sufficient time to make the

necessary comparisons to determine it a new species and the description is withheld. It is a very beautiful species, the very heavy silvery median line on head, mesonotum, and scutellum resembling those of *Culex serratus* Theobald, while the scale positions remove it from that genus.

The genus is named for Dr. Finlay, who was probably the first to suggest the connection between mosquitoes and "yellow fever."

CULICES.

Culex microannulatus Theob.

Culex annulifera, sp. nov.

♀. Head covered with dark brown and light scales, two bands of white flat scales on the sides, curved creamy, and dark forked scales on the occiput, a narrow white rim around the eyes, and a few brown hairs between the eyes: antennæ brown, verticels and pubescence brown, but giving pale reflections, first joint testaceous: palpi brown with small white apex: proboscis dark brown at base and apex, with a very broad cream-colored band, equal to one half or more the length of the proboscis, between: eyes brown.

Thorax dark brown, covered with dark brown curved scales with curved white and creamy scales in irregular and indefinite lines and spots: scutellum dark brown with cream-colored curved scales, hairs brown: metanotum dark brown: pleure dark, with numerous patches of white scales.

Abdomen covered with very dark (almost black) scales and basal white bands, sometimes extending as small lateral spots: ventrally largely white scaled with apical white spots on many of the segments. The abdominal markings vary in definiteness in the individuals, but the dorsal basal bands and the ventrolateral apical spots seem persistent, while the very small dorso-lateral spots are not.

Legs: coxæ and trochanters all more or less white scaled: femora all dorsally dark brown heavily sprinkled with white scales, white or creamy knee-spot, sometimes involving both sides of the joint, ventrally much lighter: tibiæ all dark, slightly sprinkled with white, and sometimes, on the fore and mid legs, a narrow white ring at the apex: all the metatarsi dark with narrow basal light bands, and that on the hind leg somewhat heavier and sometimes a few light scales scattered through the dark ones: first and second tarsal joints on fore and mid legs have narrow light basal bands third and fourth joints dark, sometimes a very small basal spot on the third: all the tarsal joints on the hind legs have heavy basal white bands. Fore and mid ungues equal and uniserrate, hind simple.

Wings heavily brown-scaled; cells small: first submarginal narrower than and the same length as second posterior, the base of the latter well interior; the stems of both nearly equal to the length of the cells: supernumerary cross-vein is two thirds the length of the mid-vein which it meets, posterior cross-vein is as long as the mid-vein and distant from it a little more than its own length. Halteres light, the knob white-scaled.

Length 6 mm., with proboscis 9 mm.

♂. Head much as in female except that the second pale band on the sides is not so defined and is perhaps lacking (males not in good condition): antennæ are really brown, but the reflections make them look ochraceous: palpi dark with a white spot at the bases of the ultimate and penultimate joints, and a cream-colored band dividing the remainder in halves, the plumes are rather heavy and dark, but like those of the antennæ, often look mostly light: proboscis very dark with quite a narrow cream-colored band somewhat caudad of the middle (on a line with the interior band on the palpi).

Thorax much as in female, the lines and spots less definite.

Abdomen as in female, but very hairy. Claspers large.

Legs practically as in female. Fore and mid unguis very unequal, the larger having a large tooth about midway and a short, apparently spinous, one at the base; hind unguis small and simple.

Wing not so heavily scaled, and the first submarginal is a little longer than the second posterior, their bases nearly on a line: the posterior cross-vein is a little shorter than the mid, and not quite its length distant.

Habitat. — Philippine Islands. Caught, February (Mangarin), March, April (Dagupan).

The female was described from a lot (28), all females, sent by Dr. Frank Suggs from Mangarin, Mindoro: the males from a lot (234) sent by Dr. M. A. DeLaney, First Lieutenant and Assistant Surgeon U. S. A. from Dagupan, Pangasinan, Luzon, but the insects had many of them been wet and were not in good condition. It is nearly related to *C. microannulatus* Theob. and *C. vishnui* Theob.

Culex sitiens *Wiedemann.*

C. annulioris *Theobald.*

C. hirsutum *Theobald.*

C. cæcus *Theobald.*

C. gelidus *Theobald.*

C. gelidus var. **cuneatus** *Theobald.*

C. fatigans *Wiedemann.*

Culex fragilis, sp. nov.

Female. Head dark, covered with light ochraceous, almost cream-colored, curved, and light fawn-colored forked scales on the occiput, with white flat opalescent ones on the sides and a rim around the eyes; antennæ light brown, pubescence and verticils the same; palpi light brown; proboscis light brown; eyes dark blue.

Thorax very light with two rather broad light brown submedian lines and a light greenish-brown tinge, covered with a frosty bloom much like that found on *Anopheles*, sparsely covered with very small hair-like golden scales. Scutellum light brown with similar scales; metanotum almost white; pleuræ testaceous, a soft blue-green. The whole thorax has a greenish tinge and a general translucent appearance. Abdomen dark green sparsely covered with very thin white opalescent flat scales and light brown hairs; ventrally much the same.

Legs : coxæ and trochanters colored like pleuræ, femora light fawn-colored dorsally, white ventrally ; tibiæ much the same ; metatarsi and tarsi rather darker — a light brown — the scales are all small and on these joints give golden reflections. Ungues small, simple and equal.

Wings covered with small fawn-colored scales : first submarginal a little longer and nearly the same width as second posterior, the stems of both about two thirds the length of the cells ; supernumerary cross-vein same length as mid which it meets : posterior cross-vein same length as mid and about two and a half times its length distant. Halteres, light stem, fawn-colored knob. The third long vein is extended into the base cells by an incassation nearly as heavy as that found in *Desvoidiæ*.

Length 3-3.5 mm.

Male differs very slightly from the female. Antennæ a soft light brown, and the tufts of the palpi are small and of the same general fawn-color ; the thorax frequently lacks the two light brown submedian lines and is perhaps lighter. Ungues of fore and mid legs slightly uneven, the larger bearing a long tooth about midway.

A very delicate looking insect, the general translucent appearance of the thorax and small opalescent scales giving an appearance of great fragility.

Habitat. — Oras, Samar. Caught, August 6.

The culices are mostly wide-spread, *gelidus*, *cæcus* and *fragilis* being apparently the most restricted as to localities ; *fatigans* is of course universal.

GRABHAMIÆ *Theobald.*

Grabhamia spencerii *Theobald.*

This specimen was taken at Hagonoy Bulacan, Luzon, P. I., and as *G. spencerii* was reported only from Manitoba and there were some slight variations I hesitated to place it under this species, but I have since taken it at San Francisco, Cal., and Mr. Theobald has written that it is almost surely this species, which is quite variable.

MANSONIÆ.

Mansonia annulifera *Theobald.*

Masonia africana vel **uniformis** *Theobald.*

Mr. Theobald writes me that *africana* and *uniformis* are identical, some badly preserved specimens from a different locality being responsible for the second species. *M. africana* occurs in many parts of the Islands.

ÆDOMYIÆ.

Ædeomyia squampipenna *Arribalzaga.*

This is rarely taken, only two specimens having been sent in during the three years.

There are, of course, many insects closely related to the Culicidæ, and at times some not even belonging to the dipteræ, sent in, but no effort is made to determine these, as they have no place in the problem on hand, though they are, many of them, of interest to the entomologist and may prove to be of interest to the pathologist.

Much of the country is still unexplored, so far as this research is concerned, the southern islands particularly having few collecting stations, and with the exception of the collections sent in by Major R. P. Ames, such as have been sent in have, partly owing to the change of surgeons, either been irregular or have not covered many consecutive months, so that other new species are to be expected and will undoubtedly be added to the list.

TWO NEW HYMENOPTEROUS PARASITES.

BY WILLIAM H. ASHMEAD, M.A., D.Sc.

Orgilus kearfotti, sp. nov.

♂. Length 3 mm. Honey-yellow, the head in front paler; disk of metathorax, the eyes and the stemmaticum black; flagellum dusky or brownish; a spot at apex of hind femora, the hind tibiæ, except a white annulus at base, and their tarsi, fuscous. Wings hyaline, the stigma and the veins brown.

Caldwell, N. J. One specimen, bred by Mr. W. D. Kearfott, July 2d, from *Recurvaria juniperella* Kearfott.

Type.—Cat. No. 6960, U. S. N. M.

Protapanteles recurvariæ, sp. nov.

♀. Length 1.65 mm. Head and thorax black and shining, but sparsely punctate; the clypeus, the mandibles, scape of antennæ, the abdomen at sides and beneath, the second dorsal segment, and the legs, except a spot at apex of the hind femora, the apex of hind tibiæ and the hind tarsi except basally which are fuscous, honey-yellow. Wings hyaline, the stigma brown. The ovipositor is prominent clavate, black; the plate of the first segment is trapezoidal, sculptured, the rest of the abdomen smooth, impunctured.

Montclair, N. J. Two specimens, bred by Mr. W. D. Kearfott, June 2d and 7th from *Recurvaria piccaella* Kearfott. Another specimen was bred from *R. thujaella* Kearfott.

Type. Cat. No. 6961, U. S. N. M.